



Supplementary information

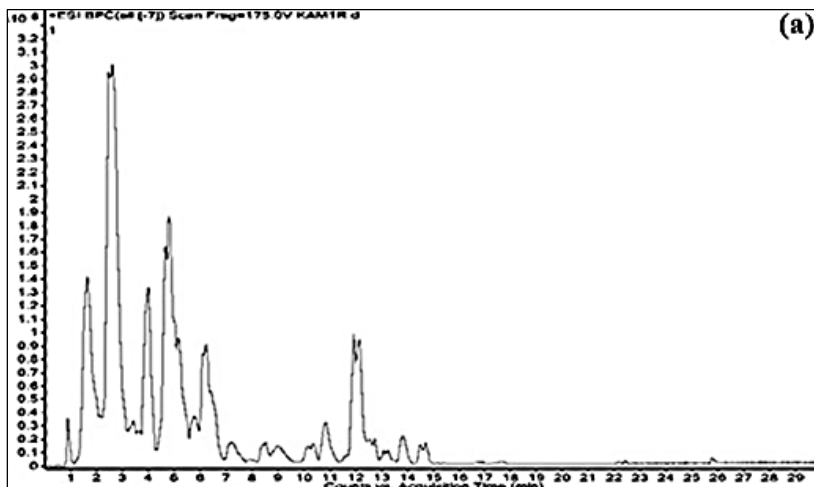
for

**STUDIES OF VACUUM-ANNEALED SINGLE-LAYERED AND
DOUBLE-LAYERED TiO₂ NANOCRYSTALLINE FILMS
SENSITIZED WITH NATURAL DYES FOR DYE-SENSITIZED
SOLAR CELL APPLICATIONS**

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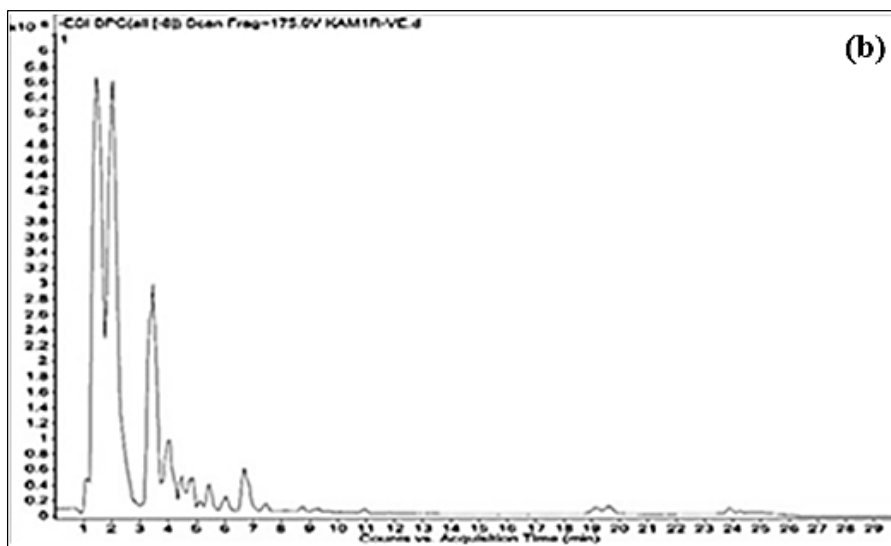


Figure S1. HR-LCMS chromatograms of bayberry extract: (a) positive ESI mode and (b) negative ESI mode.

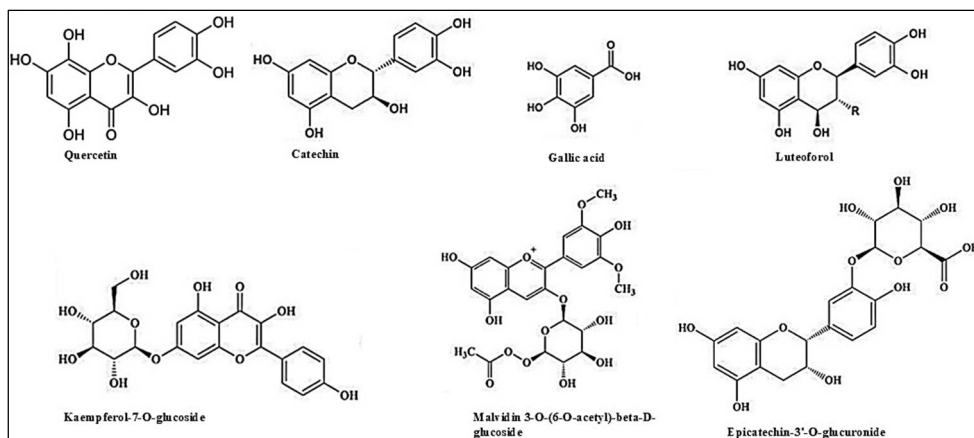


Figure S2. The structures of phenolic compounds identified from the HR-LCMS analysis of bayberry extract.

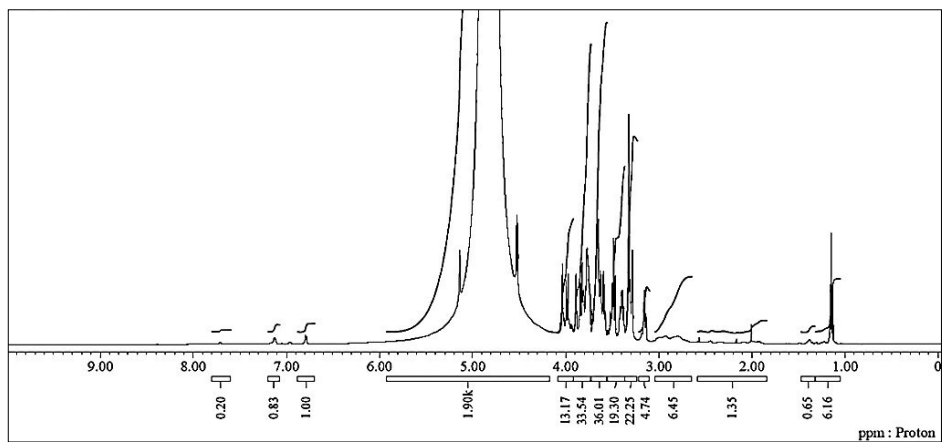
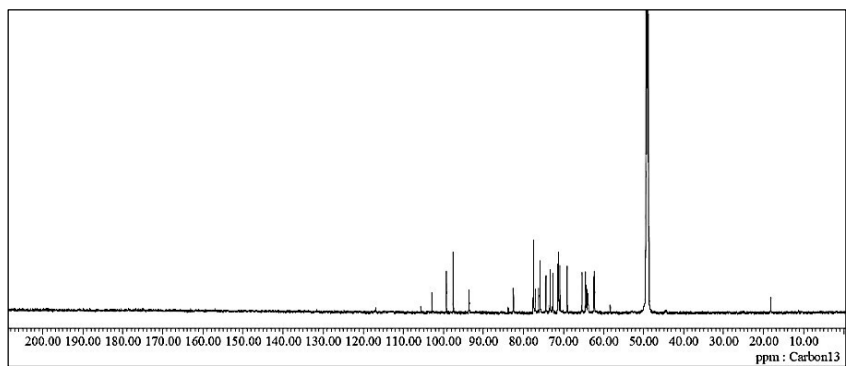
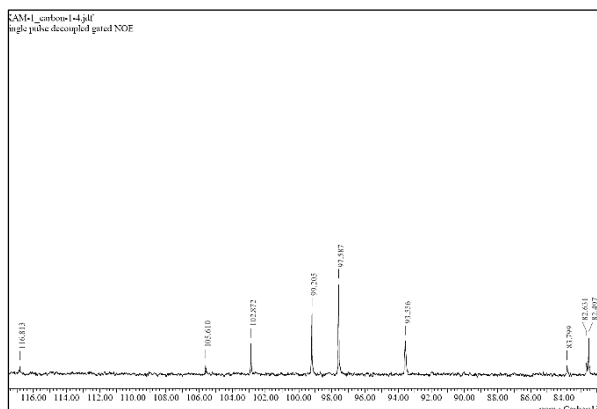


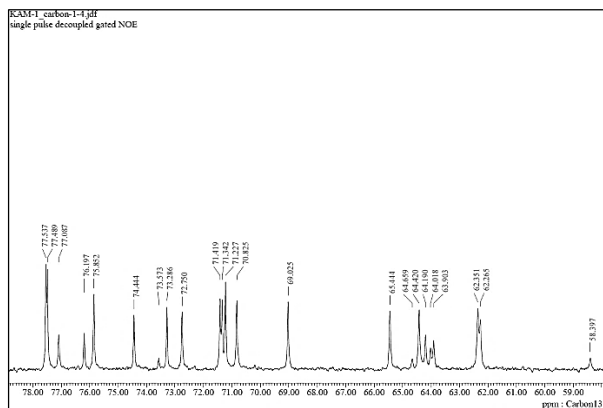
Figure S3. ¹H NMR of bayberry extract in DMSO-*d*₆ (600 MHz).



(a)



(b)



(c)

Figure S4. (a) ^{13}C NMR of bayberry extract in methanol- d_4 (600 MHz) (b) Expanded ^{13}C NMR 600 MHz of bayberry extract (82-116.9 ppm) in methanol- d_4 (600 MHz) (c) Expanded ^{13}C NMR 600 MHz of bayberry extract (58.0-78.5 ppm) in methanol- d_4 (600 MHz).

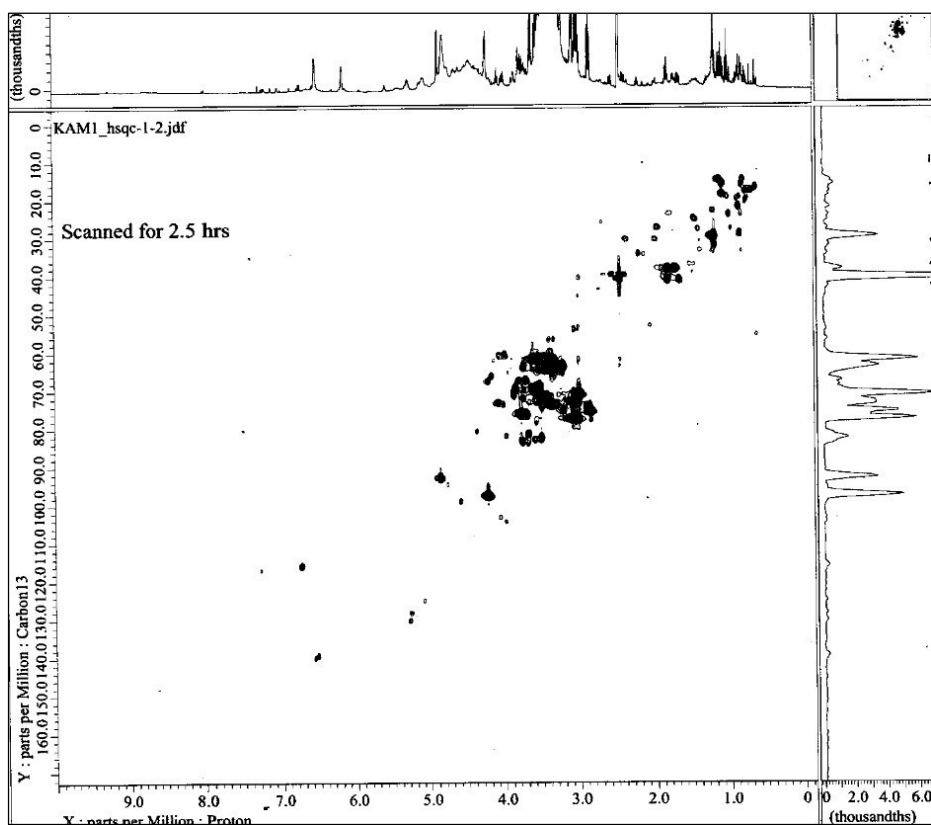
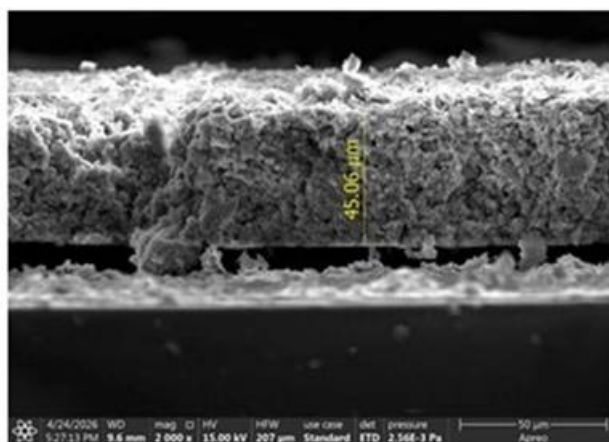
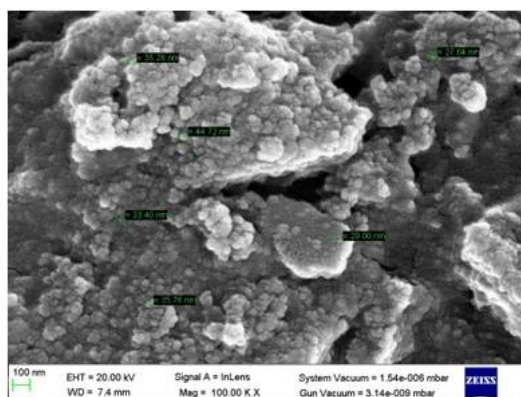


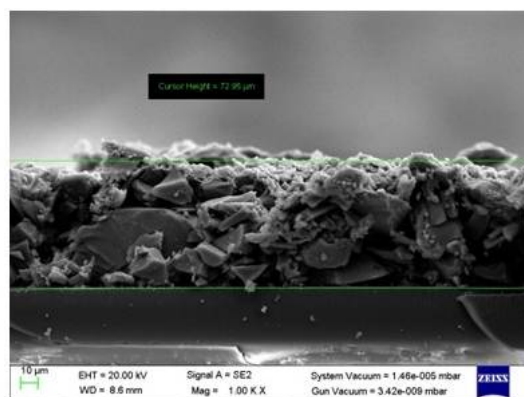
Figure S5. ^1H - ^{13}C HSQC NMR 600 MHz spectrum of bayberry extract in $\text{DMSO}-d_6$.



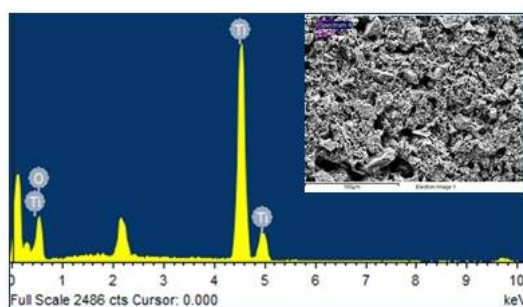
(a)



(b)



(c)



(d)

Figure S6. (a) DLVA cross-sectional image (b) SEM image surface morphology of the DLVA (c) cross-sectional micrographs of the DLVA (d) EDX elemental mapping and corresponding spectrum of the DLVA.

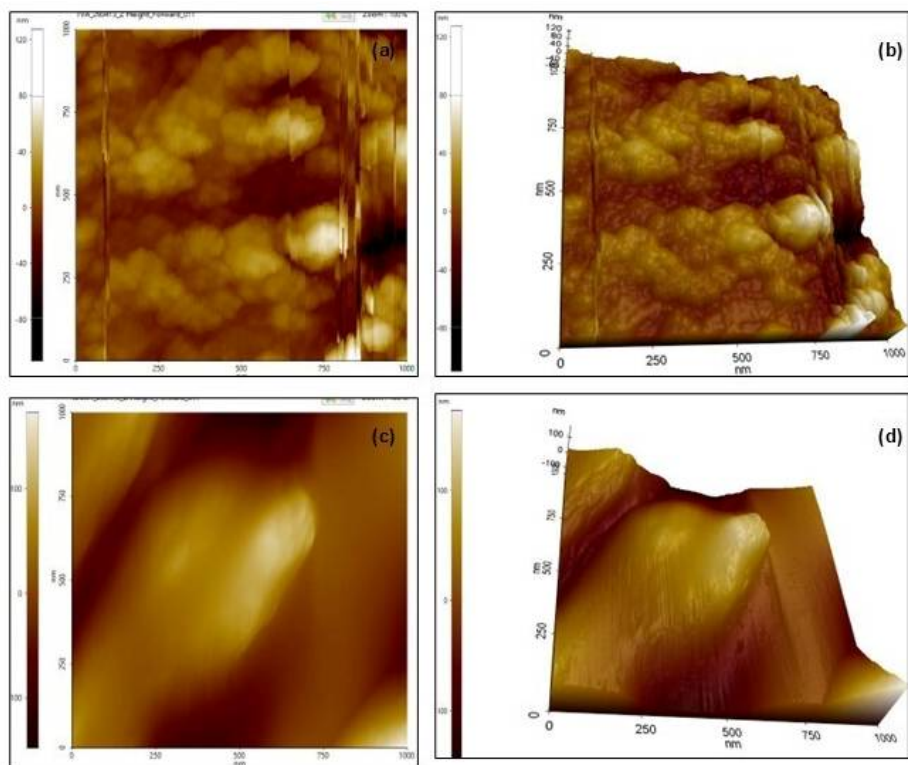


Figure S7. (a) AFM image of **SLVA** (planar view) (b) AFM image of **SLVA** (3D view) (c) AFM image of dye-sensitized **SLVA** (planar view) (d) AFM image of dye-sensitized **SLVA** (3D view).